

12 Mechanical Workshop

K. Bösiger, B. Schmid, B. Lussi, M. Schaffner, R. Meier (since October 2003), P. Treier, B. Wachter (left in October 2003), Ramon Caro (apprentice), A. Rochat (finished his apprenticeship and left in December 2003) and R. Reichen (apprentice)

Last year the workshop was mainly engaged in the development and construction of several new laboratory experiments for the medical students. We produced parts for experiments to illustrate the physical principles of the blood circulation system, the electrocardiogram, of ultrasound, of X-rays, the human eye and of an optical spectrometer. In particular, the construction of the blood circulation system was a time consuming and demanding job. Figure 12.1 shows the various assemblies. First, a prototype of each apparatus was built, tested and optimized. Then 15 pieces of each experiment were manufactured.

In fall 2003 a lathe was replaced with a new computer controlled machine (see Fig. 12.2). With the modern infrastructure of the mechanical workshop we are able to solve all kinds of demanding mechanical problems in relation to the projects described in this report. Projects from other institutes and private institutions are also worked on. These provide some income for the institute. In addition the workshop supplies over 30 institutes with metal and other technical material⁴.



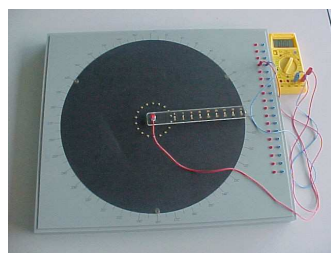
The blood circulation experiment.



Parts of the blood circulation experiment.



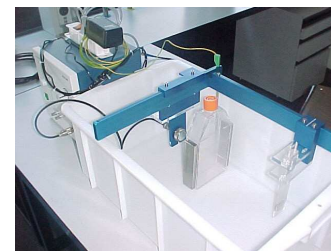
Optical bench with the model of the human eye. The focal distance is adjustable.



Setup which is used to measure the equipotential lines for different electrical field configurations.



A prism optical spectrometer.

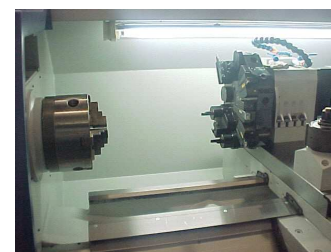


Setup to study ultrasonic sound.

*Figure 12.1:
New laboratory experiments for medical students*



The new lathe.



A closer look.

Figure 12.2: The new lathe

⁴For a catalogue see <http://www.physik.unizh.ch/groups/werkstatt/dienstleistung.html>

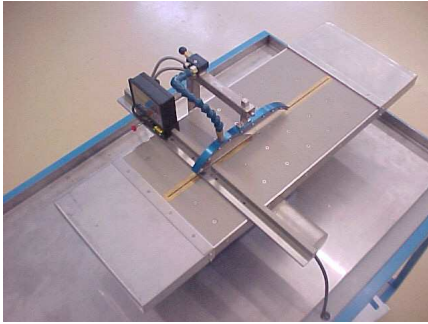


Figure 12.3: Total view of the circular saw on its stand.

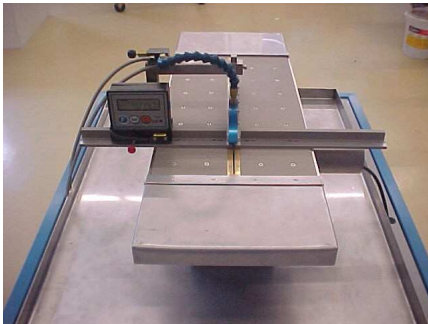


Figure 12.4: Closer look at the sawing table with the built in measuring system.

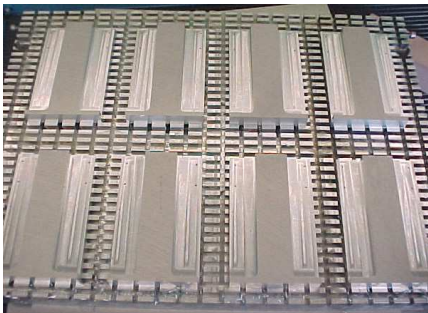


Figure 12.5: Support plate for the production of the cooling balconies of the LHCb inner tracker. Eight pieces are machined in parallel.



Figure 12.6: Gluing tool for the LHCb detector inner tracker during machining on the mill.

In the last report we presented the project of an apprentice exam work, which concludes the apprenticeship. The candidates have to do it in their home workshop. This work was successfully carried out in May 2003. Figures 12.3 and 12.4 show the completed circular saw with a diamond blade, which is now used in the workshop to cut special materials. A selection of other finished and ongoing projects is listed below:

- *Surface Physics (Group Osterwalder, Sec. 9)*
For this group the priorities were repair and maintenance work.
- *Physics of Biological Systems (Group Fink, Sec. 10)*
Different mechanical infrastructure was manufactured and some test setups were built.
- *LHCb inner tracking detector (Group Straumann, Sec. 4)*
Various parts for test stands were manufactured and the mass production of parts of the detector system was started at the end of 2003. So far, mainly cooling balconies and gluing tools are produced.